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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/608,761	06/30/2000	Klaus Binder	705649 US1 ML	2512

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EXAMINER	
SODERQUIST, ARLEN	

ART UNIT	PAPER NUMBER
1743	

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/608,761	BINDER ET AL.	
	Examiner	Art Unit	
	Arlen Soderquist	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,6,7,10,11,15-17,19,20 and 22-26* is/are pending in the application.

4a) Of the above claim(s) *15-17,19,20,22 and 23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,6,7,10,11 and 24-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 June 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 21, 2004 has been entered.

2. Figures 1-4 an 5a-5b should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance. All of these figures are showing typical catalysts or the processes that are going on in the typical catalysts. They do not include structure or methods in which a measuring pickup is placed on the catalyst or a catalyst substitute.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-2, 6-7, 10-11 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haas (US 5,143,696) or Schmelz in view of Daudel, Kurzweil, D'Amico and Tsutsumi.

In the patent Haas teaches a sensor for selective determination of gases which includes an electric capacitor having a gas permeable zeolite layer between 2 and 500 micrometer thick and being composed of a dielectric crystalline structure with a crystal size from 0.1 micrometer to 80

micrometer and having primary pores resulting in an internal surface from 100 to 1500 m^2/g, the diameter of the pores being between 0.1 and 1.5 nm which corresponds at least in order to magnitude to the kinetic diameter of the molecules of the gas to be detected, so that these molecules penetrate deep into the layer and its pores thereby changing the dielectric constant of the layer. The background discusses how such sensors are used in automobile systems. Column 4, lines 38-48, teach that a number of gases including ammonia can be sensed in this manner. Haas does not teach the scope of materials or detection methods.

In the patent Schmelz teaches a sensor for determining the gradient of ammonia concentration in waste gases. The concentration of NH_3 is determined on the basis of conductivity in flue gas and exhaust gas streams to be contacted with catalysts, using sensors from TiO_2 and ≥ 1 of WO_3, MoO_3, V_2O_5, and $V_xMo_yO_{32-z}$ where x+y 12, x,y 1 and z 1. Column 4 lines 25-42 teach that this is either the catalyst material or has the same properties as the catalyst material. Individual pairs of contacts are connected to supply leads and are disposed in the sensor material and optionally on the surface of the sensor material, for determining electrical conductivity of the sensor material between the contacts of the individual pairs of contacts. The background section discusses this in conjunction with using SCR catalysts. Figure 3 shows the finished sensor (4), with the sensor material layer (34) applied over a substrate layer (6) with contact pairs (electrodes) contacting the sensor material at several depths including the surface. In the case of an exhaust gas (36) laden with nitrogen oxides NO_x and ammonia NH_3, the sensor material layer includes known deNO_x catalyst material as listed above. The finished sensor includes a thermocouple (37) with non-illustrated terminals, on the surface (33) facing toward the exhaust gas. A further thermocouple (38) for temperature detection is disposed between the substrate layer and the sensor material layer. Through the use of the thermocouples, it is possible to provide for temperature stabilization of the sensor through heating coils (42) glued to the lower surface of the substrate layer. As a result of the sensor being temperature-stabilized to approximately 400° C, temperature-dependent changes in the adsorption characteristic of the sensor material layer are eliminated. A fixed temperature reference point obtained in this way contributes to making the conductivity values obtained by means of the sensor, and the resultant values for the concentration of the adsorbed ammonia, replicable. The measurement results that are obtained can be adapted to a catalyst operated at different temperatures, with knowledge of

the absorption characteristic of the sensor material layer as a function of the temperature T. Figures 6-8 show a second embodiment for use in a vehicle and column 8, lines 5-13 teaches a sensor that can be screwed into a $deNO_x$ (SCR) catalyst. Schmelz does not teach the scope of materials or detection methods.

In the patent Daudel teaches an exhaust gas aftertreatment device for internal combustion engines having a catalyzer for the selective catalytic reduction of oxides of nitrogen from exhaust gases of motor vehicle diesel engines, provides overstoichiometric supply of NH_3 or materials releasing NH_3. A first sensor records the NH_3 concentration contained in the exhaust gas and interrupts the supply of the NH_3 quantity when a specified upper threshold value is reached. A second sensor records the NH_3 adsorbed in the catalyzer, by way of which the NH_3 supply is resumed on reaching a specified lower threshold value. Alternatively, only one NH_3 sensor is provided in the exhaust gas aftertreatment device. The NH_3 concentration determined by this single sensor is compared, as the actual value, with a required value corresponding to a specified NH_3 concentration in order to form a correction signal which is used for triggering the metering appliance continuously connected into the gas phase.

In the abstract and paper Kurzweil teaches impedance of zeolite-based gas sensors. Changes in conductivity and capacitance of NaY- and NaPtY-zeolites allow concentrations of butane, ammonia and other gases to be determined by zeolite interdigital sensors. By impedance spectroscopy, hydrocarbon conversion can be separated from the effect of water, which appears in a different frequency range. NaY-zeolites show a moderate conductivity, which is due to the mobility of sodium and is influenced by the presence of gases adsorbed at the pore surfaces.

In the abstract and paper D'Amico describes an ammonia surface acoustic wave (SAW) gas detector. The device consists of a SAW delay line fabricated on a STX-SiO_2 substrate, whose propagation path is coated with a selectively sorbent Pt film. Absorption and desorption of ammonia in the film, produce a change in the mass density and in the elastic properties of the film which, in turn, cause a change in the SAW phase velocity. The change in velocity causes a shift in the phase at the output of the line which can be detected as a frequency shift when the line is configured in a SAW oscillator. The response of the device was investigated vs. both ammonia gas concentration in N and temperature for different values of the film thickness.

Finally the use of differential structures, to reduce the device sensitivity to temperature fluctuations was investigated and results discussed.

In the paper Tsutsumi teaches the direct measurement of interaction energy between solids and gases. The differential heat of adsorption of NH_3 on synthetic zeolites was calorimetrically measured through a thermoelectromotive force in the thermoelement (page 3576) and the distribution of the surface acidity was discussed in relation to the catalytic activity for cumene-cracking as a function of zeolite compositions. A newly designed apparatus, a twin-conduction-type calorimeter equipped with a semiconductor thermoelement and an adsorption apparatus, was used for the direct measurement of the differential heat of adsorption. The differential heat of adsorption of NH_3 decreased with the increase in surface coverage, the acid site on the surface becoming stronger up to 27 kcal/mole for NH_3-adsorption when the ratio of silica to alumina was higher and the content of exchanged ammonium ions was higher. The cumene-cracking reaction was effectively catalyzed by zeolites having such sites with heat of adsorption of NH_3 exceeding 25 kcal/mole.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the detection methods of Kurzweil, D'Amico and Tsutsumi into the methods taught by Haas or Schmelz because of their known ability to sense ammonia in the same types of environments taught by Haas and Schmelz. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use multiple sensors as taught by Daudel or Schmelz because of the ability to monitor the process in many places and gain a better control of the processes as shown for the process of Daudel.

5. Applicant's arguments filed November 21, 2003 and January 21, 2004 have been fully considered but they are not persuasive. Relative to applicant's invention being a combination, examiner points out that the claims are not directed to a combination of different sensors. Each independent claim and those which depend therefrom are directed to a single type of sensor (claim 24 lists the sensor types in the alternative and therefore only requires the presence of a single type of sensor). Thus the argument is not commensurate in scope with the claims. Relative to the combination of references being based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was

within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention on the basis of some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation is base on selection of a known material based on its suitability for the intended use (*In re Leshin*, 125 USPQ 416 (CCPA 1960) regarding this being within the level of skill of one of ordinary skill in the art) and the ability taught by the Daudel reference to gain a better control of the process by using multiple sensors. Thus there is sufficient motivation through a teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art is in the patent family of DE 19635977 which is of record and the US patent constitutes an English language equivalent of both the DE and WO documents.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose current telephone number is (571) 272-1265 as a result of the examiner moving to the new USPTO location. The examiner's schedule is variable between the hours of about 5:30 AM to about 5:00 PM on Monday through Thursday and alternate Fridays.

A general phone number for the organization to which this application is assigned is (571) 272-1700. The fax phone number to file official papers for this application or proceeding is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Arlen Soderquist

March 19, 2004

ARLEN SODERQUIST
PRIMARY EXAMINER